peratures inside vacuum tubes, by R. W. Wood. These are measured by a platinum spiral acting as a bolometer. At an internal pressure of 0·3 mm. the rise of temperature ranged from 13° to 25·7° C. as the current varied from 0·0015 to 0·0036 amperes. At greater pressures the variation for the same current was higher. The author measured the temperatures of the bright and dark spaces by mounting the spiral on a glass arm penetrating into a Torricellian vacuum, and passing down through the mercury and up through the tank. This arm could be shifted up and down without interfering with the vacuum. In every case, the bright spaces were a few degrees hotter than the dark ones.—Electrostatic deflection of kathode rays, by G. Jaumann. When a quiet line of light is produced in a vacuum tube by a feeble current, it may be temporarily deflected by moving a rubbed glass or ebonite rod in its neighbourhood. The author used an influence machine driven by an electric motor as a generator, and immersed a pear-shaped tube in oil, with the anode outside in the liquid, and not fused into the glass. A spot and a ring are produced opposite the kathode, and the former is deflected as described. As soon as the motion of the electrified body ceases, the spot returns to its first position, after a few oscillations. This phenonemon is quite distinct from the permanent deflection produced by neighbouring conductors.—A simple method of separating alternating discharges in vacuum tubes, by R. Hildebrand. Describes various arrangements of tinfoil and other conductors producing permanent deflection and curvature of kathode rays, such as are usually produced by magnets. Also confirms Jaumann's observations of temporary deflections by electrified rods, but uses an induction coil as a source.—The foundations of electrodynamics, by E. Wiechert. Introduces the conception of a rotor as representing the magnetic displacement instead of a vector, and proves its utility in explaining Röntgen and aberration phenomena.—Some properties of Röntgen rays, by A. Winkelmann and R. Straubel. Attempts to discover refraction by prisms of iron, copper, zinc, silver, lead, and platinum failed. The refractive index of iron for X-rays does not differ more than 0·00005 from unity, and is smaller, if anything. Exposures for shadowgraphs may be considerably lessened by placing the sensitive plate face downwards upon a plate of fluorspar.—Wave-length of Röntgen rays, by L. Fomm. A diffraction experiment gave 0·000014 mm. as the upper limit of the wave-length. This is about fifteen times smaller than the smallest ultra-violet wave-lengths hitherto measured.

SOCIETIES AND ACADEMIES.

London.

Entomological Society, October 21.—Prof. Raphael Meldola, F.R.S., President, in the chair.—Mr. J. J. Walker exhibited a specimen of *Emus hirtus*, L., taken at Gore Court Park, Sittingbourne, Kent, on May 30 last.—Mr. W. B. Spence sent, from Florence, for exhibition, some specimens of a cricket, *Gryllus campestris*, in small wire cages, which he stated were, in accordance with an ancient custom, sold by the Italians on Ascension-day.—Mr. F. Enock exhibited a specimen of the curious aquatic Hymenopteron *Prestwichia aquatica*, ♀, which Sir John Lubbock, F.R.S., first captured in 1862, but which had not been recorded since that date until its rediscovery in May 1896. Mr. Enock said that the male had remained unknown until June last, when he captured several swimming about in a pond at Epping. The male was micropterous, and, like the female, used its legs for propelling itself through the water.—Mr. Tutt exhibited a beautiful aberration of *Tephrosia bistortata* (*crepuscularia*), in which the ochreous ground-colour was much intensified, and the transverse shade between the median and subterminal line was developed into a brown band; the transverse basal, median and subterminal lines on the fore-wings, and the median and subterminal lines on the hind-wings, being particularly strongly marked in dark brown. Mr. Tutt also exhibited the cocoons, pupal-skin and aberrations of the imago of *Zygæna exulans*. The cocoons were spun upon one another, five in a cluster, and Mr. Tutt stated that the species was exceedingly abundant in the pupal and imaginal stages during the first week of August on the mountain slopes above Le Lautaret, in the Dauphiné Alps, at from 7000 to 9000 feet elevation. The pupa-skin was very similar to those of other Zygænids. The imagines exhibited were all aberrations.—Dr. Sharp, F.R.S., exhibited a caterpillar which had received the eggs of a parasite on the anterior part of the body, the abdomen, nevertheless, went on to the pupal metamorphosis, while the head and thorax remained attached to it in the caterpillar stage. He also called attention to some peculiarities in the pupa of *Plusia moneta*; in this species the pigmentation varies greatly in extent, and is sometimes entirely absent.—Mr. Blandford called attention to the recent discoveries relating to the Tsetse fly, made by Surgeon-Major Bruce in Zululand, which proved that this insect affected animals by injecting them with a parasitic Protozoon. The parasite was communicated from wild animals to domestic animals, and was more widely distributed than was generally believed; it, or a closely allied form, having been found in India and England in sewer rats. He said that Surgeon-Major Bruce had proved that the Tsetse fly was pupiparous, which was of importance as affecting the classification of the Diptera. Dr. Sharp said that in his opinion the Tsetse fly would cease to be troublesome with the advance of civilisation.—Mr. C. G. Barrett exhibited the pupa-skin, cocoon and eggs of *Hesperia comma*, L., found on chalk hills near Reading. He also exhibited and remarked on a series of both forms of *Tephrosia crepuscularia* and *T. biundularia*, showing an unbroken line of variation from brown to white and also to grey and black. In addition, he showed several second brood specimens of both forms obtained in the past summer by Mrs. Bazzett, of Reading.—Mr. Tutt read a paper entitled "On the specific identity of *Cœnonympha iphis* and *C. satyrion*," and exhibited a long series of specimens.—The Rev. T. A. Marshall communicated a paper entitled "A Monograph of British Braconidæ Part vii."—Mr. T. D. A. Cockerell communicated a paper entitled "New Hymenoptera from the Mesilla Valley, New Mexico."—Mr. E. Meyrick contributed a paper entitled "On Lepidoptera from the Malay Archipelago."—Dr. Sharp read a paper by Mr. G. D. Haviland and himself entitled "Termites in Captivity in England.'

Royal Microscopical Society, October 21.—Dr. R. G. Hebb, Vice-President, in the chair.—The diploma and medal awarded to the Society for photomicrographs exhibited at the Columbian Exhibition, Chicago, was laid on the table.—Lieut.-Colonel Siddons exhibited and described a new portable dissecting stand, and also a lens-carrier for use as a dissecting microscope.—Mr. C. Beck made a communication on the new screw-tools for objectives.—Prof. F. J. Bell reported that the microscopes of historical interest belonging to the Society had been exhibited at a conversazione of the Pathological Society, and were now on view.—Mr. J. Butterworth read a paper on a photomicrographic camera designed chiefly to facilitate the study of opaque objects, illustrating his remarks by a series of lantern slides shown on the screen.—Mr. T. Comber read a paper on the occurrence of endocysts in the genus *Thalassiosira*.—Mr. G. Murray detailed some observations made in connection with this subject.—Mr. F. Chapman gave a *résumé* of the ninth part of his memoir "On the Foraminifera of the Gault of Folkestone."—Mr. E. M. Nelson read a paper on a method of measuring the apertures of objectives.

Manchester.

Literary and Philosophical Society, October 20.—Mr. Charles Bailey, Vice-President, in the chair.—Mr. A. Griffiths read a paper on concurrent observations of viscosity and electric conductivity of a salt solution containing gelatine, which was allowed to set slowly at a constant temperature. He finds that the resistance does not appreciably alter even when the viscosity becomes very great. Mr. Griffiths subsequently communicated a note on the resistance of a conducting jelly, containing iron filings, in the magnetic field. He finds that a resistance so constituted becomes less by 25 per cent. in a field of 2000 C.G.S. units.

Paris.

Academy of Sciences, November 2.—M. A. Cornu in the chair.—On the disaggregation of comets, by M. O. Callandreau. The disaggregation of a comet swarm is found to depend on its density and on the nature of its path, being more marked in an elongated orbit.—The gyroscopic horizon of Admiral Fleuriais, by M. E. Guyou. A description of the adaptation of the gyroscope by the late Admiral Fleuriais for giving the vertical plane at sea. It possesses considerable practical advantages over the pendulum, and is particularly serviceable in places where the horizon is hidden by haze or fog, but where the sun can be seen. The rotation of the earth is clearly indicated by this instrument, and a small correction has to be made on this account.—New

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researches on the tubercles of the Leguminosæ, by M. C. Naudin. After reviewing the theories of previous workers on the fixation by free nitrogen by the tubercles in the Leguminosæ, the results of experiments are given in which plants were grown from seed in sterilised earth. In many cases the plants germinated five or six days sooner than plants grown in ordinary, non-sterilised earth, and were stronger, greener, and flowered sooner than the latter. The conclusion is drawn that the germs of the tubercle (bacteria, spores, or mycelium) must have been present in the seed or its envelopes. Many of the Leguminosæ, however, are refractory to infection, and it is suggested that the fixation of nitrogen may be a property of the protoplasm of the plant itself.—Note by M. E. Perrier, accompanying the presentation of the fourth part of his "Traité de Zoologie."—M. Duclaux submitted a work entitled "Pasteur, histoire d'un esprit."—On the production of floods, by M. Tarry.—The causes of universal attraction; the ether and the law of gravitation, by M. A. Baudouin.—Surface tension, by M. Langlois.—Note on the satellites attributed to the planet Venus, by M. Triboulet.—Note on storms, by M. Bougon.—On the deformation of surfaces, by M. Paul Staeckel.—Some applications of a theorem, by N. Peterson.—On the theory of partial differential equations of the second order, by M. E. Goursat.—Linear forms of the divisors of $x^2 \pm A$, by M. P. Pepin.—On the gyroscopic horizon of Admiral Fleuriais, by M. A. Schwerer. The results of experiments carried out at sea show that the maximum error in the determination of the altitude of the sun was $2'$, while the mean error was less than $1'$. After more than forty observations no appreciable wear of the pivot could be detected.—On the Röntgen phenomena, by M. B. Buguet.—On a method of measuring the temperature of incandescent lamps, by M. P. Janet. The method depends upon the assumption that the filament is pure carbon. The total heat lost by radiation between the maximum temperature attained by the filament and that of the air is measured, and the results of M. Violle on the specific heat of carbon are applied to this.—Measurement of the force acting upon non-electrified dielectric liquids placed in an electric field, by M. H. Pellat. Two vessels containing the liquid are connected, one being placed in the field and the other outside of it, and the alteration in the levels measured. The differences observed, which are very small (·06 mm. and under), agree with the calculated figures within the limits of experimental error.—On the heat of formation of lithium hydride, by M. Guntz. The heat of formation was found to be 21·6 calories, a magnitude in keeping with the great stability of the substance. A repetition of the determination of the heat of solution of lithium in water, showed the number previously obtained by Thomsen (49·08 calories) was too low, the correct figure being 53·2 calories. The difference is due to the presence of impurities in the metal used by Thomsen. At its melting point, 680°, the dissociation tension of lithium hydride is about 27 mm., showing a marked difference in this respect from the hydrides of sodium and potassium.—The uniformity of distribution of argon in the atmosphere, by M. Th. Schlœsing. Samples of air from very different sources showed a remarkable uniformity in the percentage of argon, the average value being 1·184 per cent. of the total volume of nitrogen and argon.—On a method of reproduction of double silicates of potassium and other bases, by M. André Duboin.—On French essence of roses, by MM. J. Dupont and J. Guerlain. Whilst samples of French attar of roses of two successive years agreed generally in properties, they differed from a Bulgarian sample in containing more stearoptine.—Development of *Lithocystis Schneideri*, a parasite of *Echinocardium cordatum*, by M. L. Léger.—On a viviparous ephemerid, by M. Causard. Specimens of *Chlœopsis diptera* lived over three weeks after being captured, but in spite of their relatively long life, they do not appear to take more food in the adult state than other ephemerids.—Homology of the anterior segments of some sedentary annelids, by M. Pierre Fauvel.—The use of the X-rays for anatomical researches, by MM. Ch. Remy and G. Contremoulins. By injection of the vascular system with metallic bronze powder, it is made opaque to the X-rays, and in this way it is possible to study the development of bone and teeth with greater certainty and precision than by dissection.—On the mode of formation of the Pyrenees, by M. P. W. Stuart-Menteath.—On some quaternary deposits near Eyzies, by M. Émile Rivière.—Note on some properties of numbers, by M. Delauney.—On earth tremors, and on the relations which exist between cyclones and sunspots, by M. Zenger.—On the red colour of vine leaves, by M. Levat.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

Books.—The Laughable Stories collected by Mâr Gregory John Bar-Hebrœus, edited, with an English translation, by Dr. E. A. W. Budge (Luzac).—Domestic Science Readers: V. T. Murché, Book iv. (Macmillan).—Round the Year: Prof. L. C. Miall (Macmillan).—An Intermediate Course of Practical Physics: Drs. A. Schuster and C. H. Lees (Macmillan).—Electro-Physiology: Prof. W. Biedermann, Vol. 1, translated by Miss F. A. Welby (Macmillan).—The Capillary Electrometer: G. J. Burch, Part 1 (Tucker).—Submarine Cable Laying and Repairing: H. D. Wilkinson (*Electrician* Company).—The Tears of the Heliades, or Amber as a Gem: W. A. Buffum (Low).—Chemical Lecture Experiments: G. S. Newth, new edition (Longmans).—Lehrbuch der Erdkunde: Dr. W. Ule, ii. Teil (Leipzig, Freytag).—Allgemeine Erdkunde: Dr. J. Hann, 1 Abtg. (Wien, Tempsky).—Geological Survey of Canada, Annual Report, 1894 (Ottawa).—Feathered Friends, Old and New: Dr. W. T. Greene (U. Gill).—University College of North Wales, Calendar for the Year 1896–97 (Manchester).—A Junior Course of Practical Chemistry: F. Jones, new edition (Macmillan).—A Short History of Aryan Medical Science: H.H. Sir B. Sinh Jee, Thakore Saheb of Gondal (Macmillan).—Problems of Biology: G. Sandeman (Sonnenschein).—The Clue to the Ages: E. J. Page. Part 1, Creation by Principle (Baptist Tract and Book Society).—A Manual of Quantitative Chemical Analysis: Cairns and Waller, 3rd edition (New York, Holt).—The Human Body: Dr. H. N. Martin, 7th edition (New York, Holt).—General Principles of Zoology; Prof. R. Hartwig, translated by Prof. G. W. Field (New York, Holt).—University College, Nottingham, Calendar 1896–97 (Nottingham, Sands).—Fridtiof Nansen: W. C. Brögger and N. Rolfsen, translated by W. Archer (Longmans).

Pamphlets.—Physical Science and the First Chapter of Genesis: Prof. H. E. Ryle (Macmillan).—Knight's Diagramettes, Hygiene (Chapman).—The Whales and Dolphins: Prof. R. J. Anderson, Part 2 (Belfast, Mayne).

Serials.—Natural Science, November (Page).—Longman's Magazine, November (Longmans).—Chambers's Journal, November (Chambers).—Lloyd's Natural History. Mammals, Parts 1 and 2: R. Lydekker (Lloyd)—The History of Mankind: F. Ratzel, Part 13, translated (Macmillan)—Bulletin of the American Mathematical Society, October (New York, Macmillan).—Century Magazine, November (Macmillan).—Contemporary Review, November (Isbister).—National Review, November (Arnold).—Fortnightly Review, November (Chapman).—Hypnotic Magazine, September (Chicago).—Journal of the Royal Microscopical Society, October (Williams).—Académie des Sciences de L'Empereur François Joseph I., Bulletin International. Médicine, I.; Sciences Mathématiques et Naturelles, I. (Prague).

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